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Study of Sensitivity of Vascular Tissue to Nicotine. Grant #681R2

In a study of the relationship between nicotine's action and the catecholamine metabolic inhibitor on the vascular smooth muscle, rabbit spiral aortic strips were used. After treatment with a-m-p-tyrosine, which inhibits tyrosine hydroxylase, nicotine-induced contractions were remarkably reduced by 30% of the untreated preparations. Also, metaraminol (m-hydroxynorepinephrine) releases and replaces norepinephrine at the norepinephrine storage site. It inhibits nicotine-induced contractions by 40% of the untreated control preparation. Furthermore, reserpine treatment abolished the response to the nicotine, but the guanethidine treatment reduced such a response only slightly.

Similar results were observed on the tyramine-induced contraction. However, inhibitory action of the above agents are much less than that of nicotine's. The decreased response to nicotine after treatment with metaraminol and a-m-p-tyrosine was recovered by dopamine-incubation, but not by exogenous norepinephrine-incubation.

Dissulfiram (tetra-ethylthiuran), which inhibits dopamine-b-hydroxlase, has no effect on nicotine induced contractions. It may be explained that the rabbit processes norepinephrine by a different possible biosynthetic pathway. It could bypass dopamine-b-hydroxylase and follow the octopamine CFE pathway.

The results may suggest that nicotine contractions are mediated by catecholamine release from the storage site and that exogenous norepinephrine may not be available for nicotine-induced contraction.

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